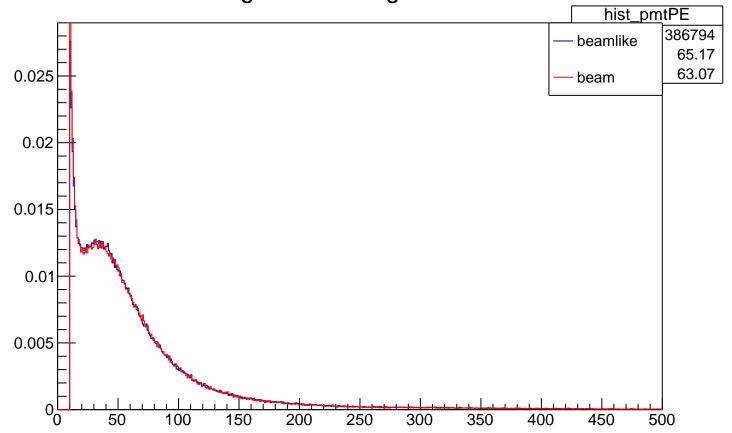
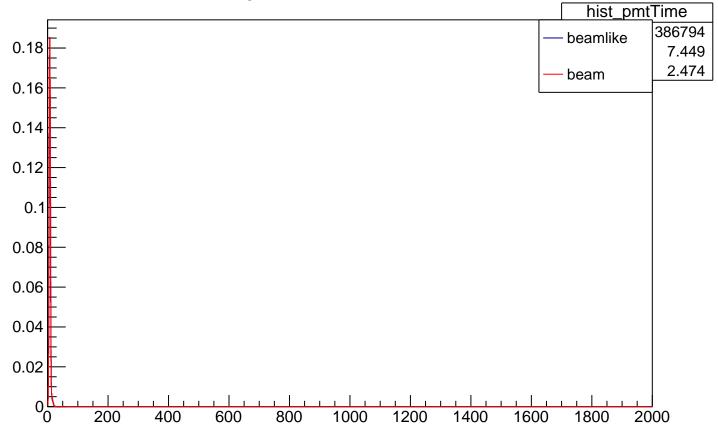
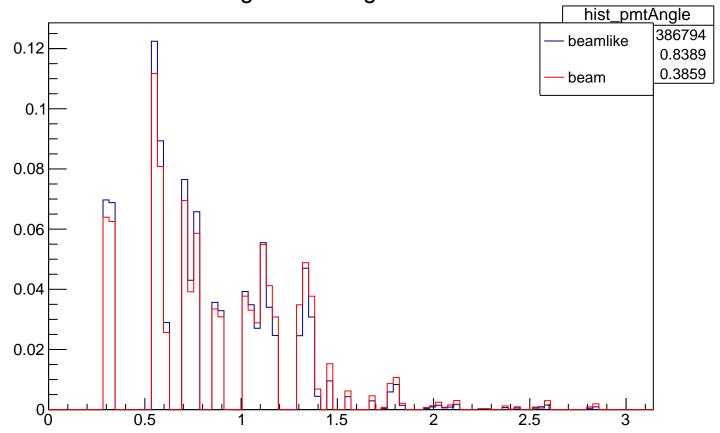
Single PMT Charge overview



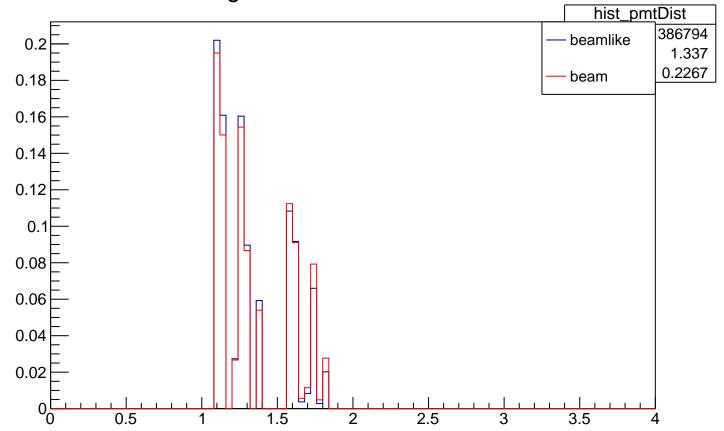
Single PMT Time overview



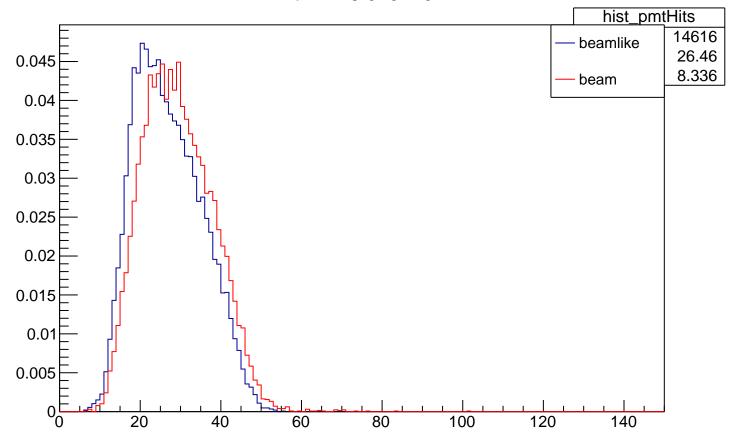
Single PMT Angle overview



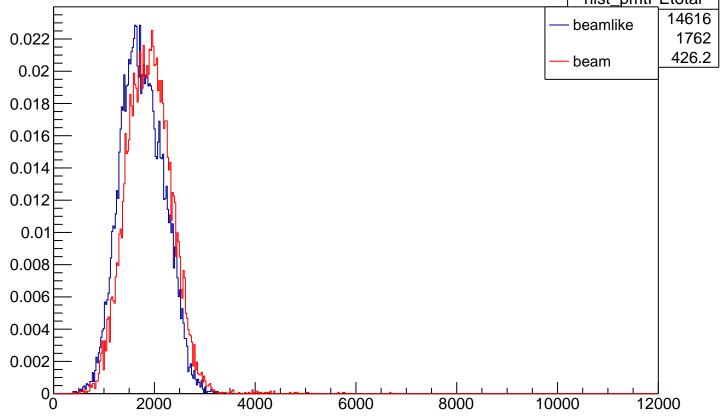
Single PMT Distance overview



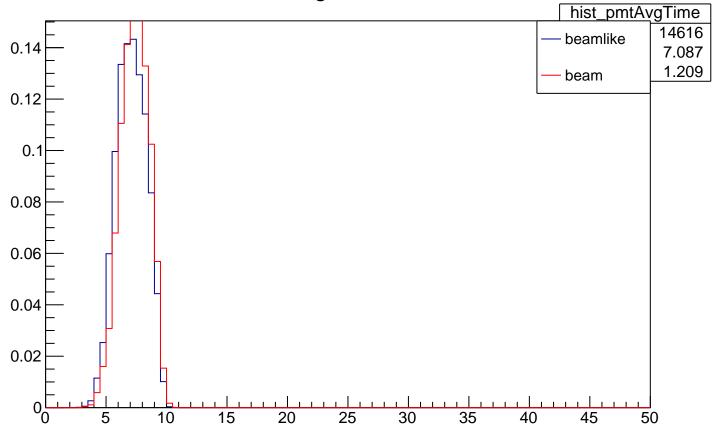
Hit PMTs overview



PMT Total Charge overview hist\_pmtPEtotal 14616 beamlike 1762 0.022 426.2 beam 0.02 0.018 0.016 0.014 0.012 0.01 0.008 0.006 0.004



PMT Average Time overview

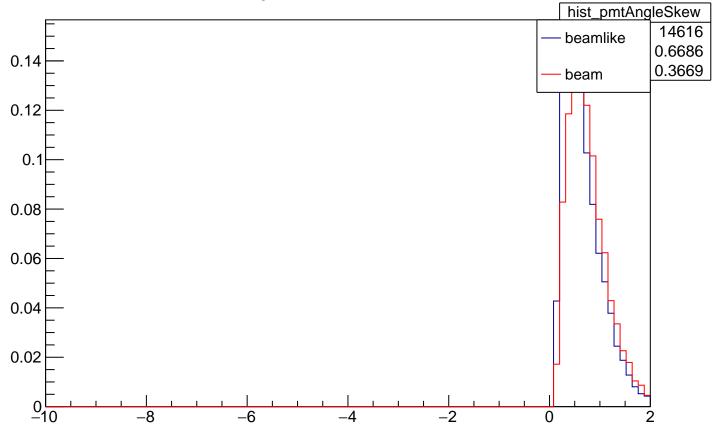


PMT Barycenter Angle overview hist\_pmtAngleBary 14616 beamlike 0.5443 0.045 0.2459 beam 0.04 0.035 0.03 0.025 0.02 0.015 0.01 0.005 0.5 1.5 2.5

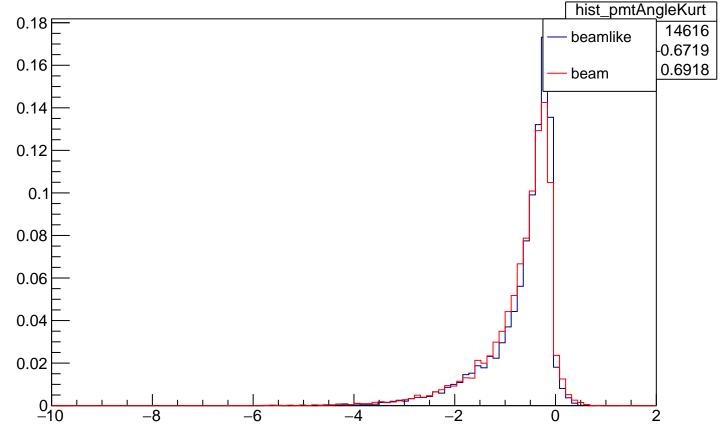
PMT Angular RMS overview hist\_pmtAngleRMS 14616 beamlike 0.1 0.8957 0.1275 beam 0.08 0.06 0.04 0.02 0 0.5 1.5 2.5

PMT Angular Variance overview hist\_pmtAngleVar 14616 beamlike 0.6493 0.05 0.2617 beam 0.04 0.03 0.02 0.01 0.5 1.5 2.5

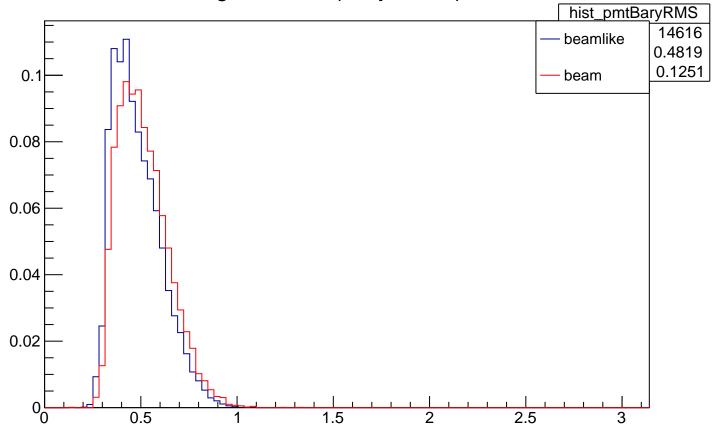
PMT Angular Skewness overview



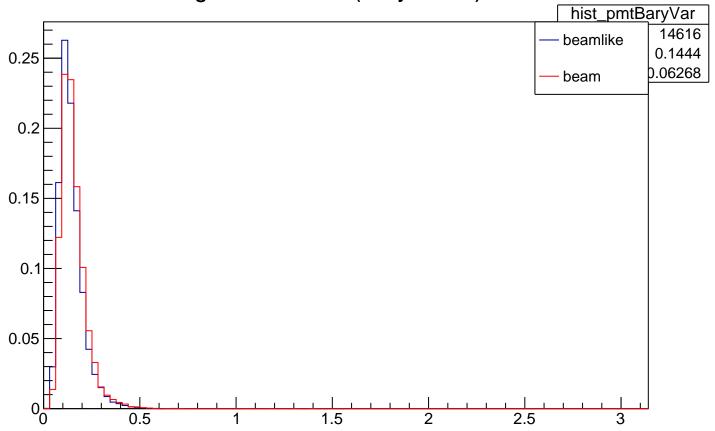
PMT Angular Kurtosis overview



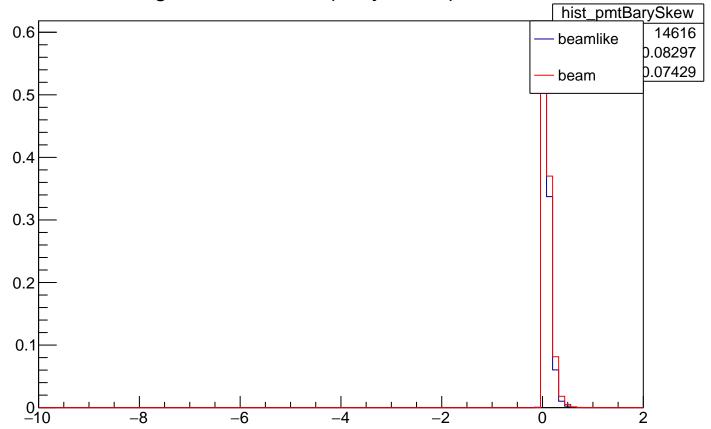
PMT Angular RMS (Barycenter) overview



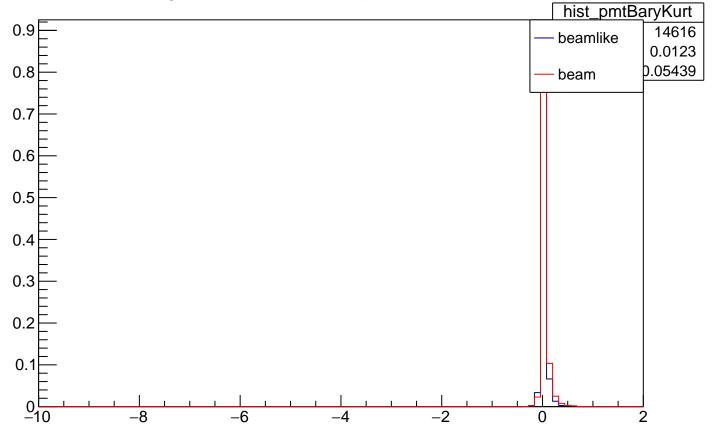
PMT Angular Variance (Barycenter) overview



Angular Skewness (Barycenter) overview



Angular Kurtosis (Barycenter) overview



Fraction of PMT hits in Ring (weighted) hist\_pmtFracRing 14616 beamlike 0 beam 8.0 0.6 0.4 0.2

0.5

0.4

0.6

0.7

8.0

0.9

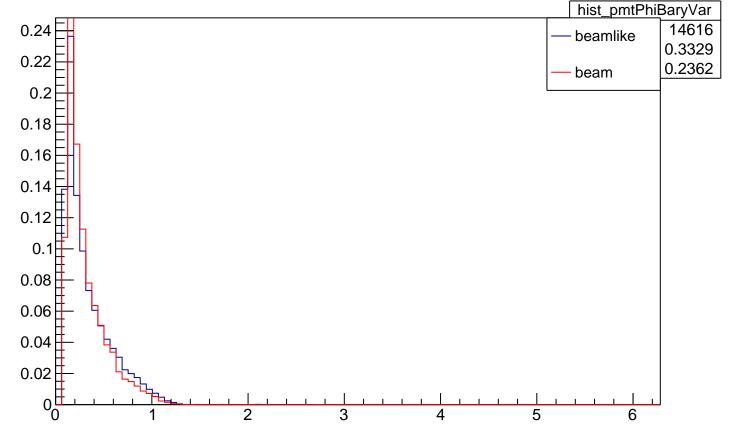
0.3

0.2

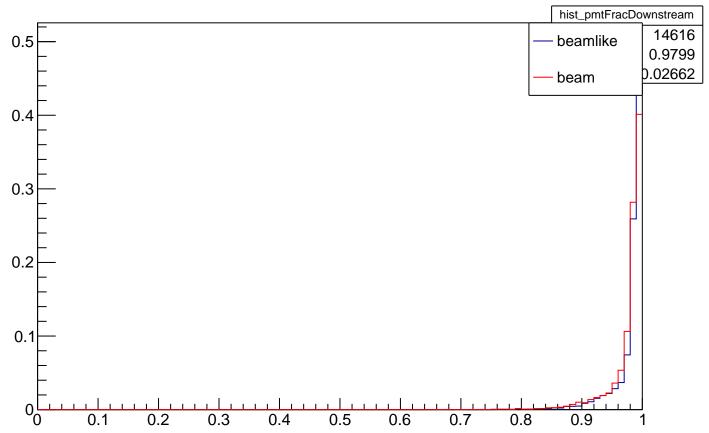
0 L

Phi RMS (Barycenter) hist\_pmtPhiBaryRMS 14616 beamlike 0.68 0.06 0.2239 beam 0.05 0.04 0.03 0.02 0.01 0 0.5 1.5 2.5

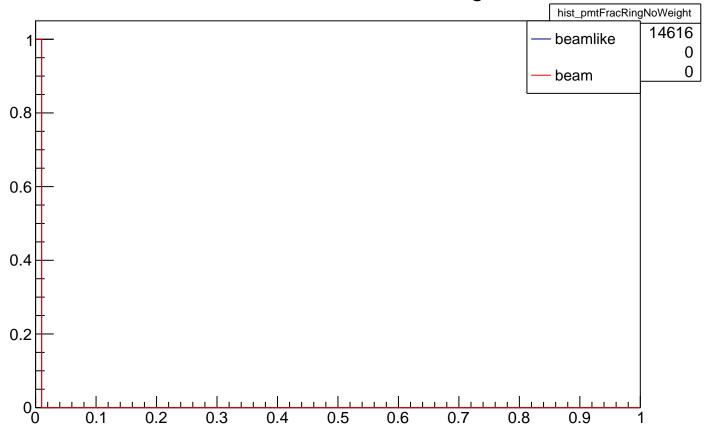
Phi Variance (Barycenter)



Fraction of PMT hits downstream



Fraction of PMT hits in Ring



Charge fraction highest PMT hist\_pmtFracHighestQ 0.07 14616 beamlike 0.1889 0.07183 beam 0.06 0.05 0.04 0.03 0.02 0.01

0.5

0.4

0.6

0.7

8.0

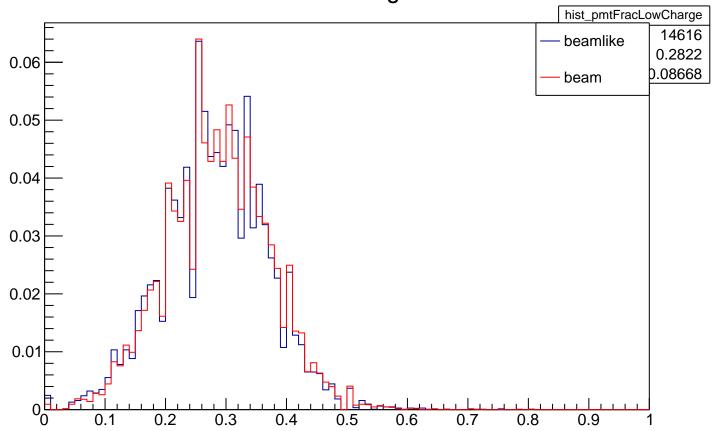
0.9

0.2

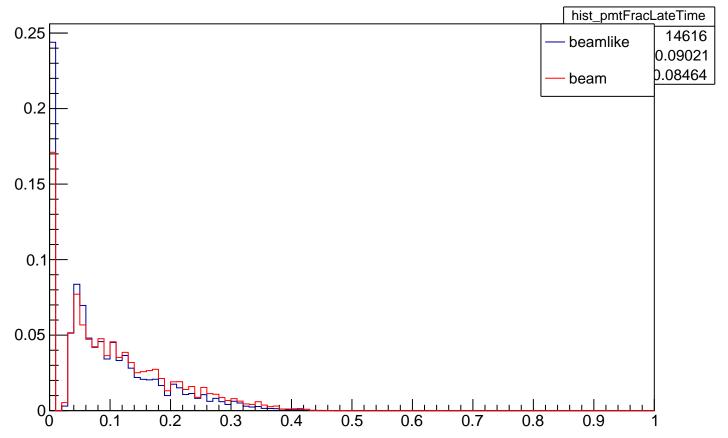
0.1

0.3

Fraction of low charge PMT hits

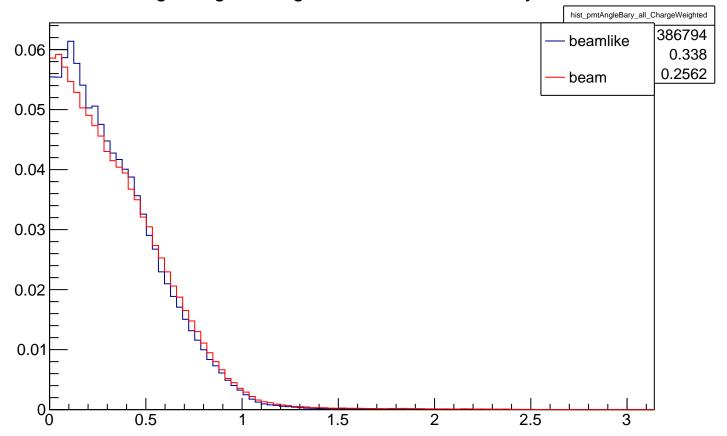


Fraction of late PMT hits



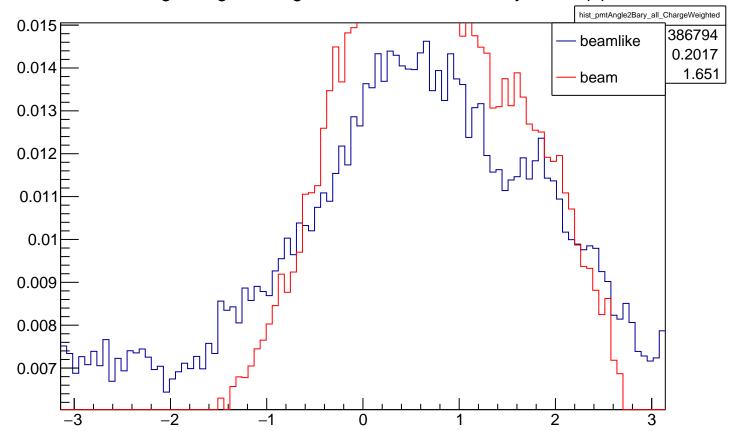
Angular distribution w.r.t. barycenter hist\_pmtAngleBary\_all 0.04 386794 beamlike 0.4723 0.3309 beam 0.035 0.03 0.025 0.02 0.015 0.01 0.005 0, 0.5 1.5 2.5

Charge weighted angular distribution w.r.t. barycenter



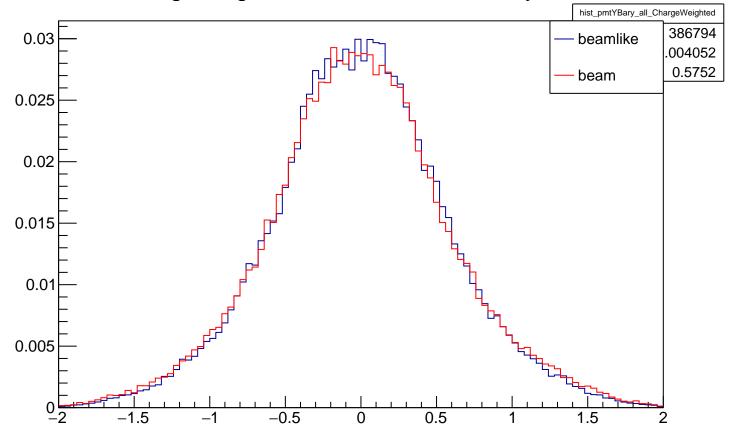
Angular distribution w.r.t. barycenter (II) hist\_pmtAngle2Bary\_all 0.013 386794 beamlike 0.1437 1.731 beam 0.012 0.011 0.01 0.009 0.008

Charge weighted angular distribution w.r.t. barycenter (II)



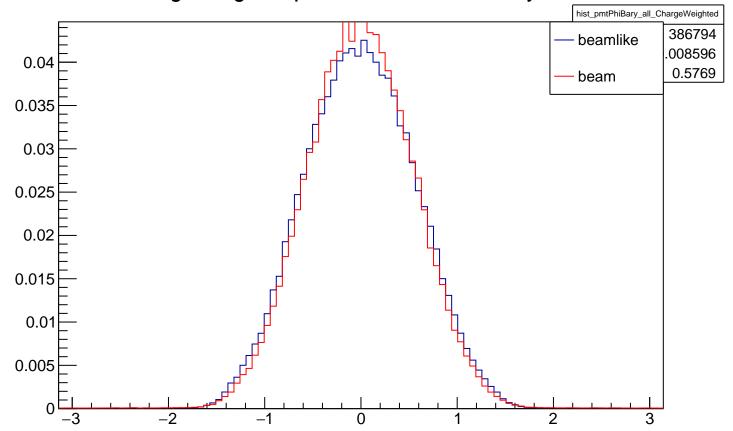
Y distribution w.r.t. barycenter hist\_pmtYBary\_all 386794 beamlike 0.02 .001796 0.7473 beam 0.018 0.016 0.014 0.012 0.01 0.008 0.006 0.004 0.002 -1.5 -0.50.5 1.5

Charge weighted Y distribution w.r.t. barycenter

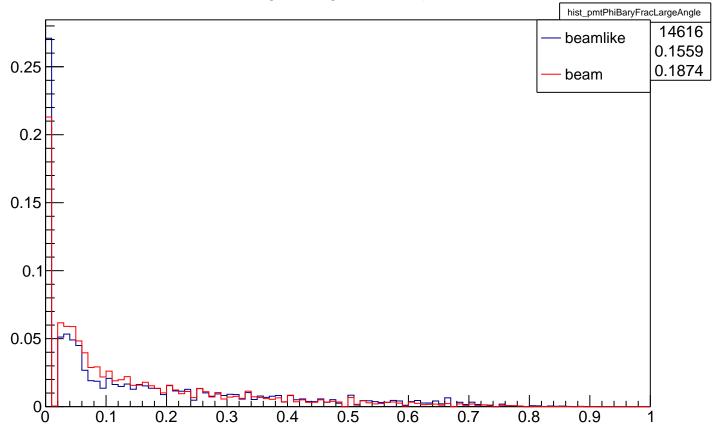


Phi distribution w.r.t. barycenter hist\_pmtPhiBary\_all 386794 0.035 beamlike 0.01105 0.688 beam 0.03 0.025 0.02 0.015 0.01 0.005

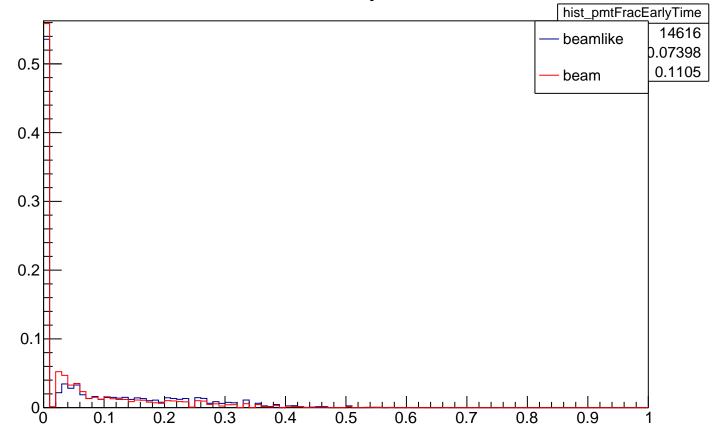
Charge weighted phi distribution w.r.t. barycenter



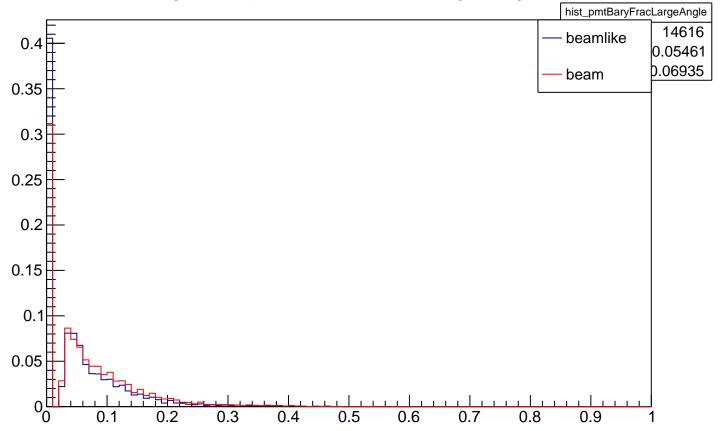
Phi Large Angles (Barycenter)



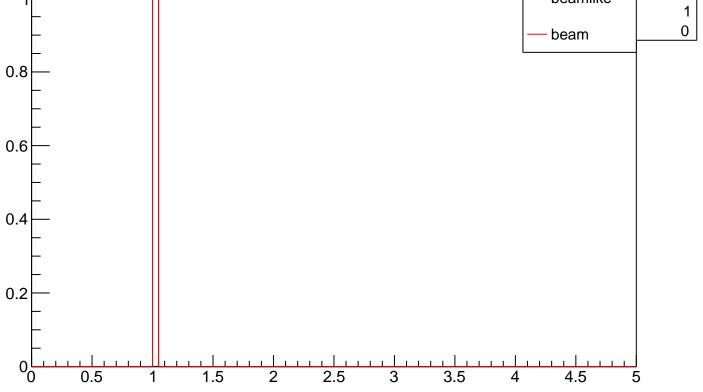
Fraction of early PMT hits



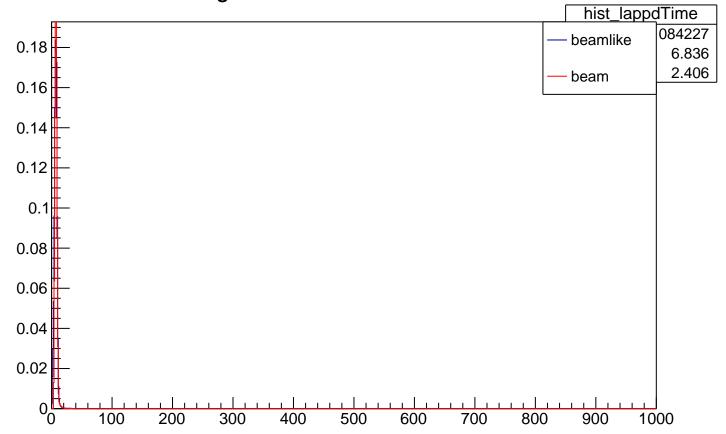
Angle (Barycenter) fraction large angles



Single LAPPD Hit Charge overview hist\_lappdPE 084227 beamlike beam

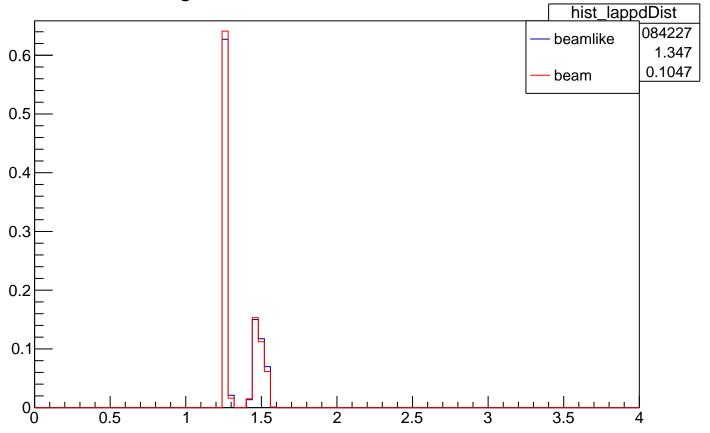


Single LAPPD Hit Time overview

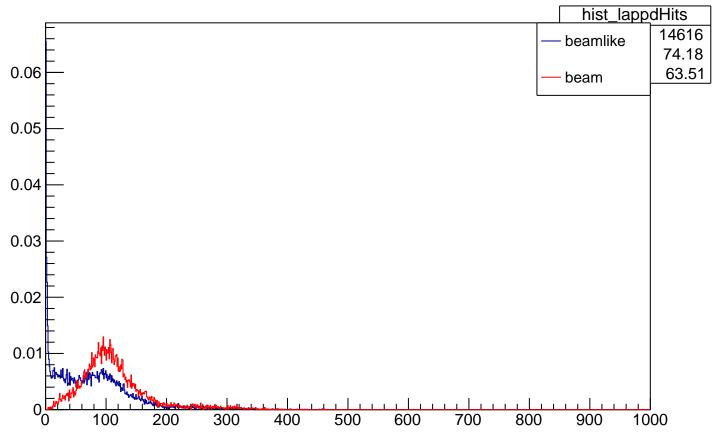


Single LAPPD Hit Angular overview hist\_lappdAngle 084227 beamlike 0.12 0.5026 0.2906 beam 0.1 0.08 0.06 0.04 0.02 0 r 0.5 1.5 2.5

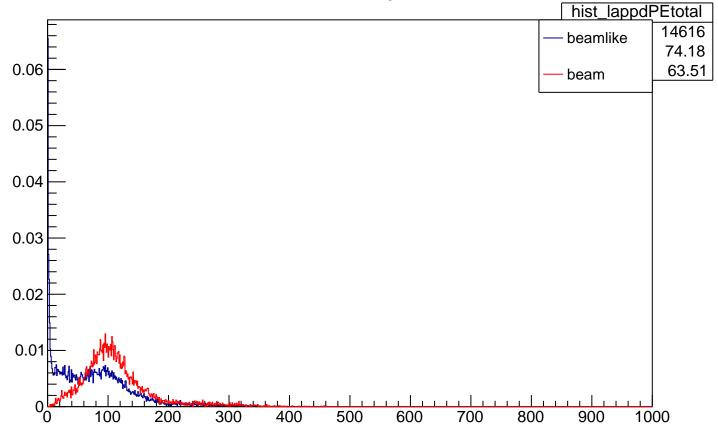
Single LAPPD Hit Distance overview



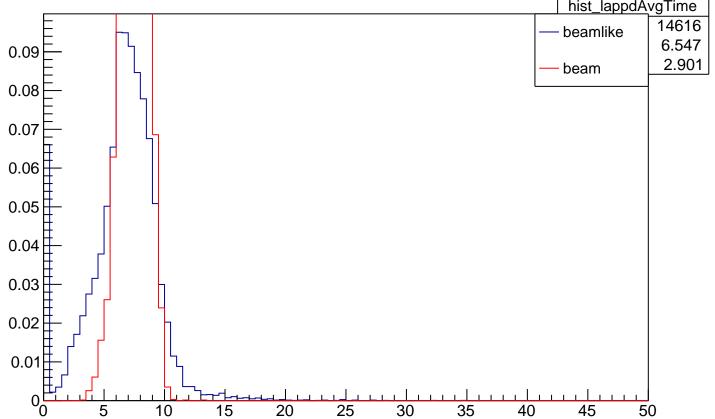
Number LAPPD Hits overview



LAPPD Total Charge overview

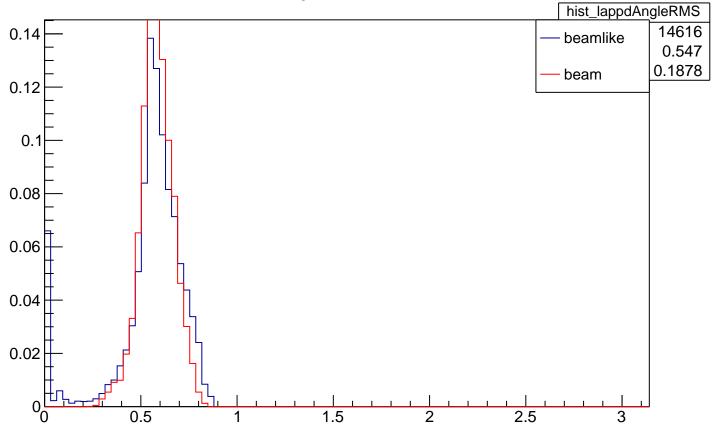


LAPPD Average Time overview hist\_lappdAvgTime beamlike beam



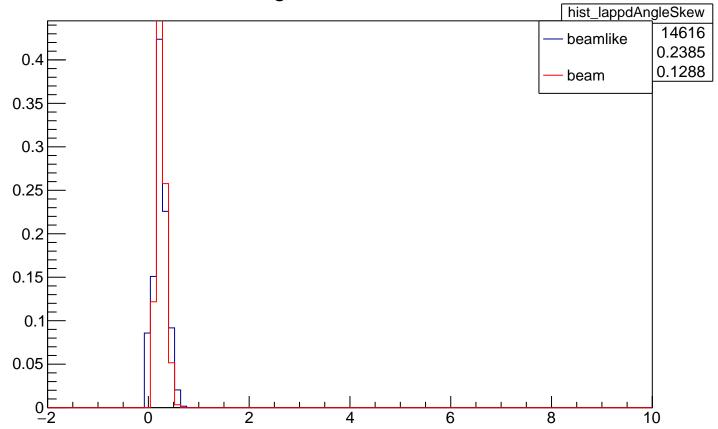
LAPPD Barycenter Angle overview hist\_lappdAngleBary 14616 0.08 beamlike 0.3564 0.2133 beam 0.07 0.06 0.05 0.04 0.03 0.02 0.01 0, 0.5 1.5 2.5

LAPPD Angular RMS overview

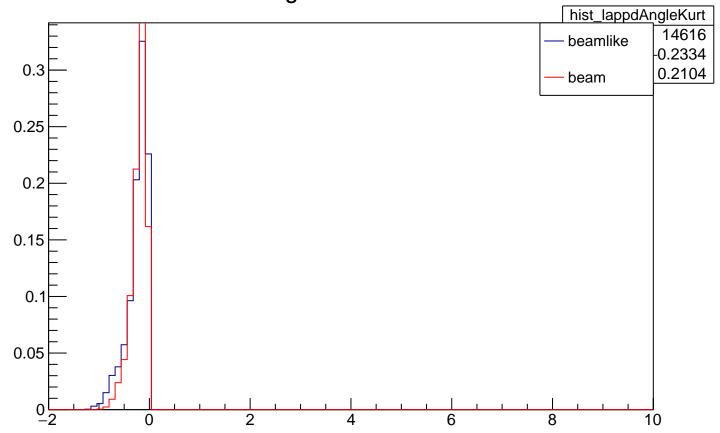


LAPPD Angular Variance overview hist\_lappdAngleVar 14616 beamlike 0.12 0.3345 0.1559 beam 0.1 0.08 0.06 0.04 0.02 0 L 0.5 1.5 2.5

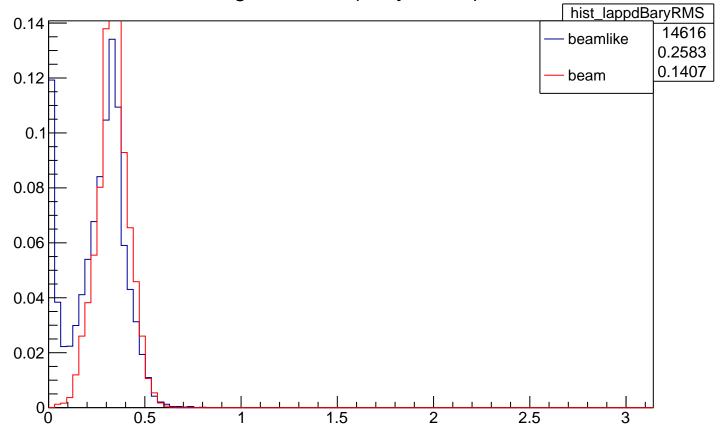
LAPPD Angular Skewness overview



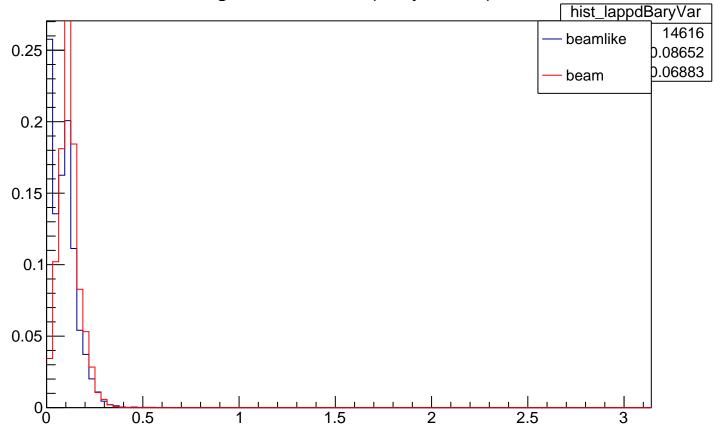
LAPPD Angular Kurtosis overview



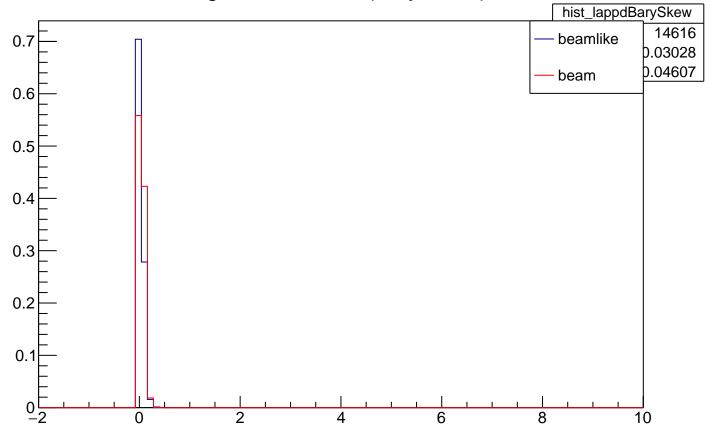
LAPPD Angular RMS (Barycenter) overview



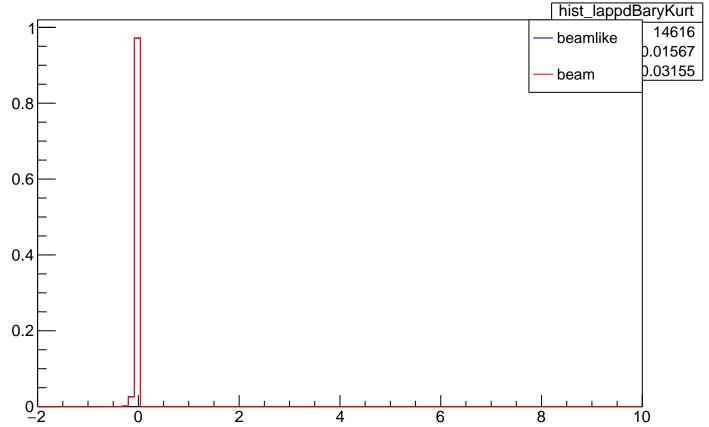
LAPPD Angular Variance (Barycenter) overview



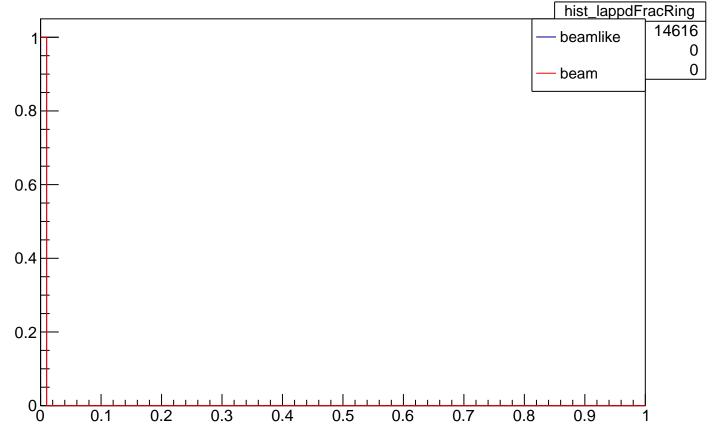
LAPPD Angular Skewness (Barycenter) overview



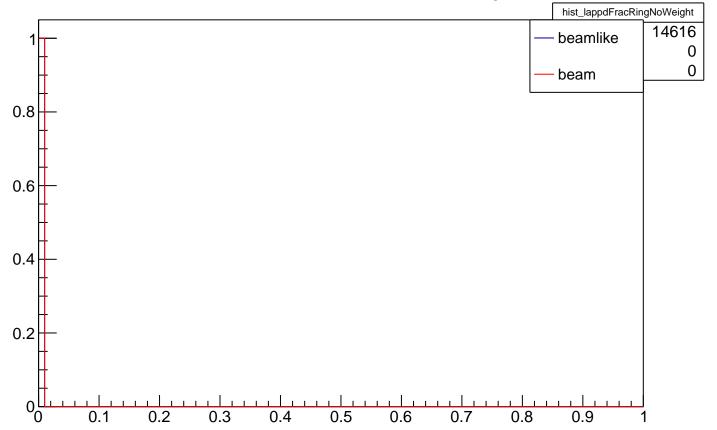
LAPPD Angular Kurtosis (Barycenter) overview



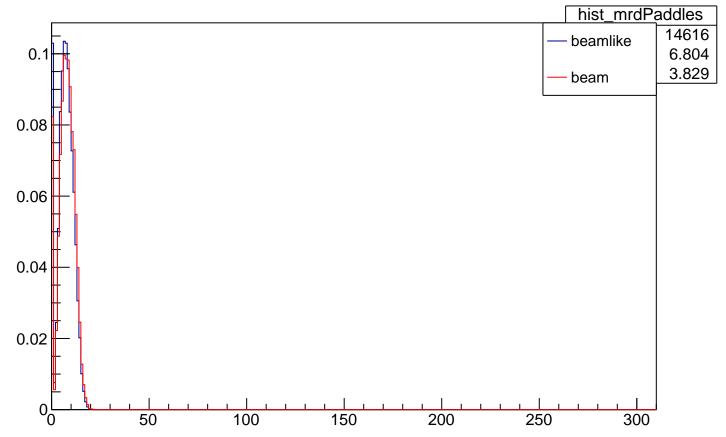
Fraction of LAPPD Hits in Ring



Fraction of LAPPD Hits in Ring

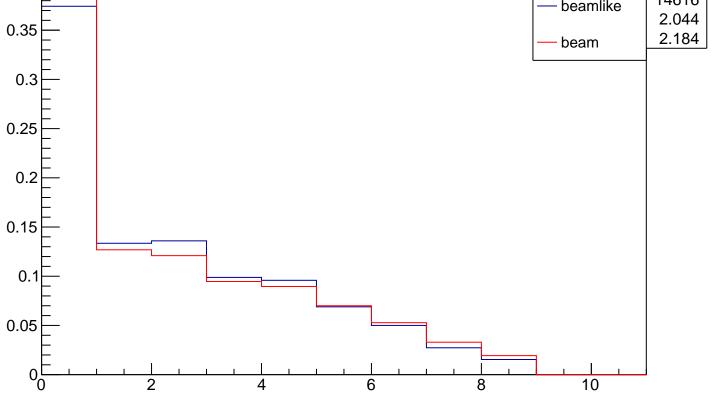


Num MRD Paddles hit

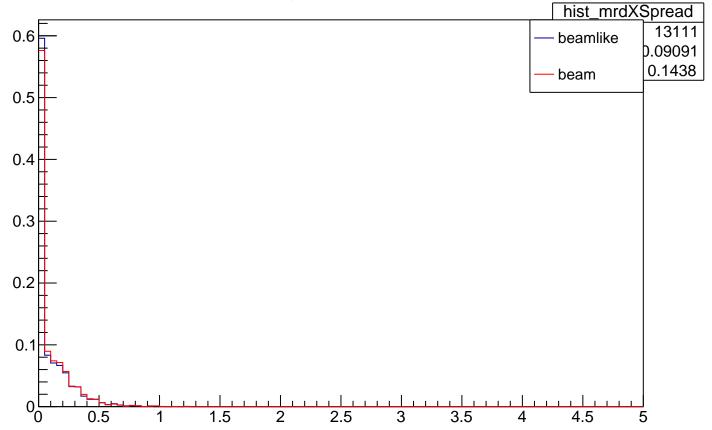


Num MRD Layers hit hist\_mrdLayers 14616 beamlike 5.117 0.14 2.719 beam 0.12 0.1 0.08 0.06 0.04 0.02 2 6 10

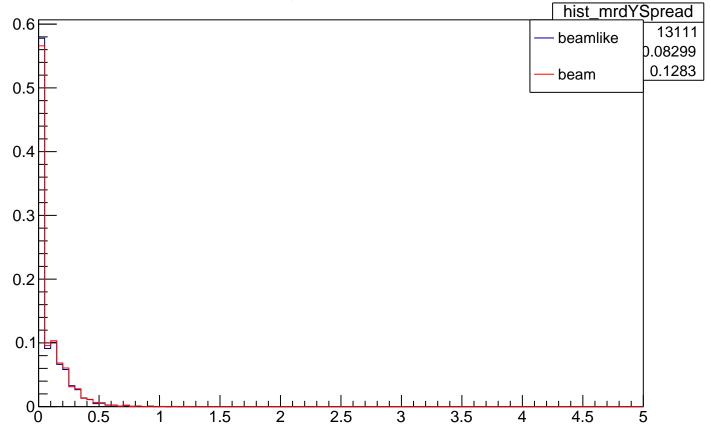
Num consecutive MRD Layers hit hist\_mrdconsLayers 14616 beamlike 2.044 2.184 beam



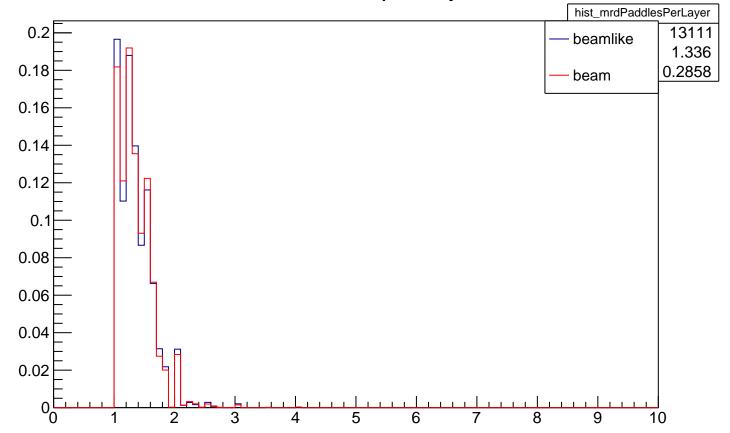
MRD Layer-wise X spread



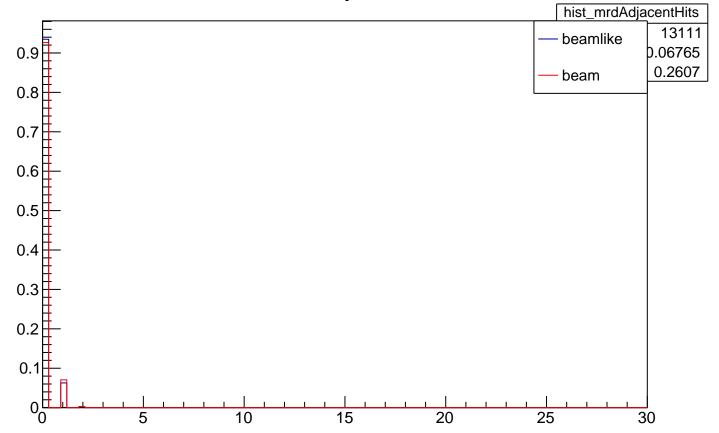
MRD Layer-wise Y spread



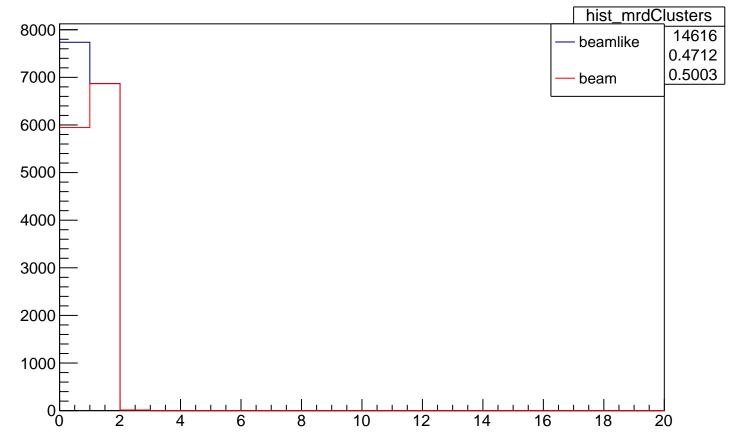
MRD Paddles per Layer



MRD # Adjacent hits



## **Num MRD Clusters**



Energy primary particle hist\_energy 14616 beamlike 814.2 193.1 beam 0.0025 0.002 0.0015 0.001 0.0005 0 500 1000 1500 2000 2500 3000 3500 5000 4000 4500

Number of rings hist\_nrings 14616 beamlike beam 0.8 0.6 0.4 0.2 0, 2 10 12 20 14 16 18

Multiple Rings hist\_multiple\_rings 14616 beamlike 0 0 beam 8.0 0.6 0.4 0.2 0, 0.2 0.6 0.8 1.2 1.6 1.8 0.4 1.4